As filed with the U.S. Securities and Exchange Commission on November 17, 2014

Registration No. 333-

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM F-1
REGISTRATION STATEMENT
UNDER THE SECURITIES ACT OF 1933

ADVANCED ACCELERATOR APPLICATIONS S.A.
(Exact name of Registrant as specified in Its charter)

Not Applicable
(Translation of Registrant's name into English)

FRANCE	**2834**	**NOT APPLICABLE**
(State or other jurisdiction of incorporation or organization)	(Primary Standard Industrial Classification Code Number)	(I.R.S. Employer Identification Number)

20 rue Diesel
01630 Saint Genis Pouilly, France
+33 (0) 4 50 99 30 70
(Address, Including Zip Code, and Telephone Number, Including Area Code, of Registrant's Principal Executive Offices)

National Registered Agents, Inc.
111 Eighth Avenue
New York, New York 10011
(888-579-0286)
(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

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Davis Polk & Wardwell LLP	**Davis Polk & Wardwell LLP**	**Dechert LLP**
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New York, NY 10017	**75008 Paris, France**	**New York, NY 10036**

Approximate date of commencement of proposed sale to the public: As soon as practicable after the effective date of this registration statement.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, check the following box. ☐

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

CALCULATION OF REGISTRATION FEE

Title of each class of securities to be registered	Proposed maximum aggregate offering price[(1)(2)]	Amount of registration fee
Ordinary shares, €0.10 nominal value per share, in the form of ADSs	$ 100,000,000	$ 11,620

(1) Estimated solely for the purpose of computing the amount of the registration fee pursuant to Rule 457(o) under the Securities Act of 1933.

(2) Includes ordinary shares represented by American Depositary Shares, or ADSs, which the underwriters have the option to purchase to cover over-allotments, if any.

The Registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, as amended, or until the registration statement shall become effective on such date as the Commission, acting pursuant to such Section 8(a), may determine.

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The information in this prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This prospectus is not an offer to sell these securities and it is not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.

Subject to completion, dated November 17, 2014

PROSPECTUS

American Depositary Shares
Representing Ordinary Shares

Advanced Accelerator Applications S.A.

(incorporated in France)

This is the initial public offering of American Depositary Shares, or ADSs, representing ordinary shares of Advanced Accelerator Applications S.A., a French company. Each ADS will represent ordinary shares, nominal value €0.10 per share.

The underwriters may also purchase up to ADSs within 30 days to cover over-allotments, if any.

We expect the initial public offering price will be between US$ and US$ per ADS. We intend to apply to list our ADSs on the Nasdaq Global Market under the symbol "AAAP".

Neither the U.S. Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

We are an "emerging growth company" under the U.S. federal securities laws and will be subject to reduced public company reporting requirements. Investing in the ADSs involves risks. See "Risk Factors" beginning on page 16 of this prospectus.

	Per ADS	Total
Public offering price	$	$
Underwriting discounts and commissions	$	$
Proceeds, before expenses, to us	$	$

Our ADSs will be ready for delivery on or about , 2014.

Citigroup **Jefferies**

Canaccord Genuity **JMP Securities**

The date of this prospectus is , 2014.

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Unless otherwise indicated or the context otherwise requires, all references in this prospectus to "AAA" or the "Company," "we," "our," "ours," "us" or similar terms refer to Advanced Accelerator Applications S.A., together with its subsidiaries.

Our consolidated financial statements are presented in Euros. All references in this prospectus to "$," "US$," "U.S. dollars," "dollars" and "USD" mean U.S. dollars and all references to "€" and "Euros," mean Euros, unless otherwise noted. Throughout this prospectus and solely for convenience, we have converted Euros to dollars at the noon buying rate of €1.00=US$1.3690 and we have converted U.K. pounds sterling to dollars at the noon buying rate of £1.00=US$1.7105, each as certified by the Federal Reserve Bank of New York at June 30, 2014. Throughout this prospectus, references to ADSs mean ADSs or ordinary shares represented by ADSs, as the case may be.

We have not authorized anyone to provide any information other than that contained in this prospectus or in any free writing prospectus prepared by or on behalf of us or to which we may have referred you. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. We and the underwriters have not authorized any other person to provide you with different or additional information. Neither we nor the underwriters are making an offer to sell the ADSs in any jurisdiction where the offer or sale is not permitted. This offering is being made in the United States and elsewhere solely on the basis of the information contained in this prospectus. You should assume that the information appearing in this prospectus is accurate only as of the date on the front cover of this prospectus, regardless of the time of delivery of this prospectus or any sale of the ADSs. Our business, financial condition, results of operations and prospects may have changed since the date on the front cover of this prospectus.

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SUMMARY

This summary highlights information contained elsewhere in this prospectus. This summary may not contain all the information that may be important to you, and we urge you to read this entire prospectus carefully, including the "Risk Factors," "Business" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" sections, our consolidated financial statements and the notes thereto and our unaudited interim condensed consolidated financial statements and the notes thereto, each included elsewhere in this prospectus, before deciding to invest in the ADSs.

Our Business

Overview

We are an innovative radiopharmaceutical company that develops, produces and commercializes molecular nuclear medicine, or MNM, diagnostic and therapeutic products. MNM is a medical specialty that uses trace amounts of radioactive compounds to create functional images of organs and lesions and to treat diseases such as cancer. We have built a leadership position in MNM in Europe by manufacturing and commercializing our broad portfolio of six diagnostic products for a number of clinical indications, and by selectively acquiring and integrating complementary businesses and assets. We leverage our leadership position, industry experience and know-how to pursue targeted research and development, or R&D, strategies. Our lead therapeutic candidate, Lutathera, is a novel compound that we are currently developing for the treatment of midgut neuroendocrine tumors, or NETs, a significant unmet medical need. Lutathera is a Lutetium-177, or Lu-177, labeled somatostatin analogue peptide that has received orphan drug designation from the European Medicines Agency, or EMA, and the U.S. Food and Drug Administration, or FDA. Orphan drug designation is granted by the EMA and the FDA for product candidates intended for the treatment of rare diseases or conditions and qualifies a company for tax credits and market exclusivity for up to ten years in Europe and up to seven years in the United States if the product candidate obtains EMA marketing authorization or FDA approval, respectively. Lutathera is currently administered on a compassionate use and named patient basis for the treatment of NETs in nine European countries. We have identified that Lutathera has been used in approximately 2,900 patients and is currently in a pivotal Phase 3 trial for the treatment of progressive inoperable midgut NETs. Our total sales have grown from €40.8 million (US$55.9 million) for the year ended December 31, 2012 to €53.8 million (US$73.7 million) for the year ended December 31, 2013 and from €26.3 million (US$34.5 million) for the six months ended June 30, 2013 to €33.2 million (US$45.5 million) for the six months ended June 30, 2014.

The foundation of our growth has been our portfolio of six diagnostic positron emission tomography, or PET, and single-photon emission computed tomography, or SPECT, products. PET and SPECT are imaging techniques in molecular nuclear diagnostics, or MND, with applications in clinical oncology, cardiology, neurology and inflammatory/infectious diseases. Our leading diagnostic product is Gluscan, our branded 18-fluorodeoxyglucose, or FDG, PET imaging agent. Gluscan assists in the diagnosis of serious medical conditions, primarily in oncology, by assessing glucose metabolism. We are building on our diagnostics foundation by developing additional MND product candidates to further strengthen our existing portfolio. We are in pre-clinical development for Somakit, Lutathera's companion PET diagnostic candidate, and have initiated Phase 1/2 clinical trials for rhAnnexin V-128, or Annexin V-128, a SPECT product candidate for the imaging of apoptotic and necrotic lesions with applications in a broad range of indications such as rheumatoid arthritis.

Our novel therapeutic candidate, Lutathera, is a Lu-177-labeled somatostatin analogue peptide that we are developing in the field of molecular nuclear therapy, or MNT. Somatostatin is an important regulator of the endocrine system and somatostatin analogues have been approved for symptomatic treatment of NETs since 1987. NETs are a heterogeneous group of tumors originating in the neuroendocrine cells of the body, and approximately two thirds of NETs arise in the gastro-entero-pancreatic tract. There are currently no approved treatments for most NETs, representing a significant unmet medical need in an orphan indication for which we believe Lutathera shows significant promise. Lutathera is in a pivotal Phase 3 trial for patients with inoperable progressive midgut NETs, a subset of NETs arising in the gastro-entero-pancreatic tract, and has demonstrated positive initial safety and efficacy results in previous trials for both midgut NETs and pancreatic NETs, or pNETs, another subset of NETs arising in the gastro-entero-pancreatic tract. In its

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Phase 1/2 trial, Lutathera (which was then called Lu177-Dotatate or Lutate) showed progression-free survival, or PFS, of 45.1 months in a subgroup analysis of 51 NET patients with midgut carcinoid tumors that had progressed within the 12 months preceding the patients' entry into the study, and PFS of 30 months in a subgroup analysis of 103 pNET patients. On the basis, in part, of these positive results and published efficacy and safety data on Lutathera, physicians treating NET patients have sought and have received authorization to use Lutathera on a compassionate use and named patient basis in nine European countries. We expect to announce Phase 3 trial results for Lutathera by the first half of 2016 and to submit a new drug application, or NDA, in the United States and a marketing authorization application, or MAA, in Europe in the same year. We have formulated Lutathera with a three-day shelf life, which we believe will enable us to efficiently produce and sell it in Europe through our European manufacturing and commercialization infrastructure. In the United States, we intend to construct or acquire a production facility for Lutathera that will provide the U.S. supply of Lutathera, which we intend to commercialize (if we obtain FDA approval) with a U.S.-based sales force that we will organize. In our discussion of the studies and/or trials related to Lutathera here and elsewhere in this prospectus, we use the name Lutathera to refer both to the product candidate as it is currently named and centrally produced, and to Lu-177-Dotatate or Lutate, which were earlier names for the same compound as it was reconstituted at the relevant clinical site. We chose the name Lutathera for the compound beginning with its Phase 3 trial.

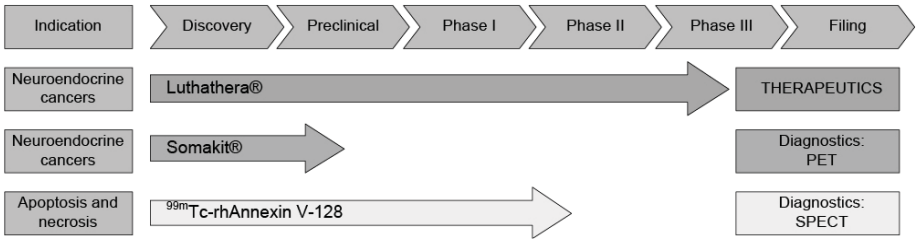
We manufacture a majority of our products at our 16 production sites. Our PET production sites are strategically positioned close to our customers. We sell our products through our sales and marketing network, which is supported by over 300 employees throughout Europe, North America and Israel. We have a direct sales and marketing presence in eight countries and generate sales in 19 countries. This platform enables us to secure production and sales from partnerships of choice with global healthcare players, including large pharmaceutical companies, for whom we manufacture MNM products.

The global MNM market is estimated at approximately US$4.1 billion as of December 31, 2013 (with 96% of sales in MND and 4% of sales in MNT) according to MEDraysintell. While the market is largely concentrated in MND, where we have a leading position in Europe, MNT represents a fast-growing field in MNM. MEDraysintell projects that MNT sales may constitute up to US$13.0 billion of total MNM sales of US$24.0 billion by 2030, representing an annual growth rate of 30%.

At June 30, 2014, we had 314 employees: 110 in Italy, 95 in France, 37 in Spain, 17 in the United Kingdom, 14 in Israel, 13 in Portugal, 11 in Germany, nine in Poland, five in the United States, two in Switzerland, and one in Canada. Since that date, we have continued to expand the number of employees supporting our production, marketing and sales infrastructure.

Our Product Candidates in Clinical Development

Our pipeline of emerging MNM product candidates addresses a number of significant unmet diagnostic and medical needs. We describe our lead product candidates and their proposed indications in more detail below.



Lutathera. Lutathera is a Lu-177-labeled somatostatin analogue peptide that has received orphan drug designation from the EMA and the FDA and has been approved for treatment of NETs on a compassionate use and named patient basis in nine European countries. We have identified that it has been

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